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National Recommended Water Quality Criteria - Aquatic Life Criteria Table

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This table contains the most up to date criteria for aquatic life ambient water quality criteria. Aquatic life criteria for toxic chemicals are the highest concentration of specific pollutants or parameters in water that are not expected to pose a significant risk to the majority of species in a given environment or a narrative description of the desired conditions of a water body being "free from" certain negative conditions. The table below lists EPA's recommended aquatic life criteria. State and tribal governments may use these criteria or use them as guidance in developing their own.

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National Recommended Aquatic Life Criteria table

Pollutant (P = Priority Pollutant)	CAS.(Chemical Abstracts Service) Number	Freshwater CMC.(Criteria Maximum Concentration) ¹ (acute) (µg/L)	Freshwater CCC.(Criterion Continuous Concentration) ² (chronic) (µg/L)	Saltwater CMC.(Criteria Maximum Concentration) ¹ (acute) (µg/L)	Saltwater CCC.(Criterion Continuous Concentration) ² (chronic) (µg/L)	Publication Year	Notes
Acrolein (P)	107028	3ug/L	3ug/L	—	—	2009	
Aesthetic Qualities	—	—	—	—	—	1986	See Quality Criteria for Water, 1986 ("Gold Book") for narrative statement.

<u>Aldrin</u> (P)	309002	3.0	—	1.3	—	1980	These criteria are based on the <u>1980 criteria</u> which used different Minimum Data Requirements and derivation procedures from the <u>1985 Guidelines</u> . If evaluation is to be done using an averaging period, the acute criteria values given should be divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines.
Alkalinity	—	—	20000	—	—	1986	The CCC of 20mg/L is a minimum value except where alkalinity is naturally lower, in which case the criterion cannot be lower than 25% of the natural level.
alpha-Endosulfan (P)	959988	0.22	0.056	0.034	0.0087	1980	<p>These criteria are based on the <u>1980 criteria</u> which used different Minimum Data Requirements and derivation procedures from the <u>1985 Guidelines</u>. If evaluation is to be done using an averaging period, the acute criteria values given should be divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines.</p> <p>This value was derived from data for endosulfan and is most appropriately applied to the sum of alpha-endosulfan and beta-endosulfan.</p>
<u>Aluminum</u> pH 5.0 - 10.5	7429905	--	--	—	—	2018	The criteria is based on the water chemistry data (for pH, hardness and DOC) entered into the criteria calculator for a given location.

<u>Ammonia</u>	7664417	—	—	—	—	2013 (Freshwater), 1989 (Saltwater)	<u>Freshwater criteria</u> are pH, temperature and life-stage dependent. <u>Saltwater criteria</u> are pH and temperature dependent.
Arsenic	7440382	340	150	69	36	1995	<p>This recommended water quality criterion was derived from data for arsenic (III), but is applied here to total arsenic.</p> <p>Freshwater and saltwater criteria for metals are expressed in terms of the dissolved metal in the water column. See Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria.</p>
Atrazine	1912249						
<u>Bacteria</u>	—	—	—	—	—	1986	See Quality Criteria for Water, 1986 ("Gold Book") for narrative statement.
beta-Endosulfan (P)	33213659	0.22	0.056	0.034	0.0087	1980	<p>These criteria are based on the 1980 criteria which used different Minimum Data Requirements and derivation procedures from the 1985 Guidelines. If evaluation is to be done using an averaging period, the acute criteria values given should be divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines.</p> <p>This value was derived from data for endosulfan and is most appropriately applied to the sum of alpha-endosulfan and beta-endosulfan.</p>

<u>Boron</u>	—	—	—	—	—	1986	See Quality Criteria for Water, 1986 ("Gold Book") for narrative statement.
<u>Cadmium (P)</u>	7440439	1.8	0.72	33	7.9	2016	Freshwater acute and chronic criteria are hardness-dependent and were normalized to a hardness of 100 mg/L as CaCO ₃ to allow the presentation of representative criteria values. . Freshwater and saltwater criteria for metals are expressed in terms of the dissolved metal in the water column. See Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria .
<u>Carbaryl</u>	63252	2.1	2.1	1.6	—	2012	
<u>Chlordane (P)</u>	57749	2.4	0.0043	0.09	0.004	1980	These criteria are based on the 1980 criteria which used different Minimum Data Requirements and derivation procedures from the 1985 Guidelines . If evaluation is to be done using an averaging period, the acute criteria values given should be divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines.
<u>Chloride</u>	16887006	860000	230000	—	—	1988	
<u>Chlorine</u>	7782505	19	11	13	7.5	1986	
<u>Chlorpyrifos</u>	2921882	0.083	0.041	0.011	0.0056	1986	

<u>Chromium (III)</u> (P)	16065831	570	74	—	—	1995	<p>Freshwater and saltwater criteria for metals are expressed in terms of the dissolved metal in the water column. See Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria.</p> <p>The freshwater criterion for this metal is expressed as a function of hardness (mg/L). The value given here corresponds to a hardness of 100 mg/L.</p>
<u>Chromium (VI)</u> (P)	18540299	16	11	1,100	50	1995	<p>Freshwater and saltwater criteria for metals are expressed in terms of the dissolved metal in the water column. See Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria.</p>
<u>Color</u>	—	—	—	—	—	1986	<p>See Quality Criteria for Water, 1986 ("Gold Book") for narrative statement.</p>
<u>Copper</u> (P)	7440508	—	—	4.8	3.1	2007	<p>Freshwater criteria calculated using the Biotic Ligand Model.</p> <p>Freshwater and saltwater criteria for metals are expressed in terms of the dissolved metal in the water column. See Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria.</p>
<u>Cyanide</u> (P)	57125	22	5.2	1	1	1985	<p>These recommended water quality criteria are expressed as µg free cyanide (CN/L).</p>

<u>Demeton</u>	8065483	—	0.1	—	0.1	1985	
<u>Diazinon</u>	333415	0.17ug/L	0.17ug/L	0.82ug/L	0.82ug/L	2005	
<u>Dieldrin (P)</u>	60571	0.24	0.056	0.71	0.0019	1995	The freshwater CCC criterion and both Saltwater criteria are based on the 1980 criteria which used different Minimum Data Requirements and derivation procedures from the 1985 Guidelines . If evaluation is to be done using an averaging period, the acute criteria values given should be divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines.
<u>Endrin (P)</u>	72208	0.086	0.036	0.037	0.0023	1995	The derivation of the CCC for this pollutant did not consider exposure through the diet, which is probably important for aquatic life occupying upper trophic levels.
<u>gamma-BHC (Lindane) (P)</u>	58899	0.95	—	0.16	—	1995	The Saltwater CCC criterion is based on the 1980 criteria which used different Minimum Data Requirements and derivation procedures from the 1985 Guidelines . If evaluation is to be done using an averaging period, the acute criteria values given should be divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines.
<u>Gases, Total Dissolved</u>	—	—	—	—	—	1986	See Quality Criteria for Water, 1986 ("Gold Book") for narrative statement.

Guthion	86500	—	0.01	—	0.01	1986	See Quality Criteria for Water, 1986 ("Gold Book") for narrative statement.
Hardness	—	—	—	—	—	1986	See Quality Criteria for Water, 1986 ("Gold Book") for narrative statement.
Heptachlor (P)	76448	0.52	0.0038	0.053	0.0036	1980	These criteria are based on the 1980 criteria which used different Minimum Data Requirements and derivation procedures from the 1985 Guidelines . If evaluation is to be done using an averaging period, the acute criteria values given should be divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines.
Heptachlor Epoxide (P)	1024573	0.52	0.0038	0.053	0.0036	1981	<p>These criteria are based on the 1980 criteria which used different Minimum Data Requirements and derivation procedures from the 1985 Guidelines. If evaluation is to be done using an averaging period, the acute criteria values given should be divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines.</p> <p>This value was derived from data for heptachlor and there was insufficient data to determine relative toxicities of heptachlor and heptachlor epoxide.</p>
Iron	7439896	—	1000	—	—	1986	See Quality Criteria for Water, 1986 ("Gold Book") for narrative statement.

<u>Lead (P)</u>	7439921	82	3.2	140	5.6	1984	<p>Freshwater and saltwater criteria for metals are expressed in terms of the dissolved metal in the water column. See Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria.</p> <p>The freshwater criterion for this metal is expressed as a function of hardness (mg/L). The value given here corresponds to a hardness of 100 mg/L.</p>
<u>Malathion</u>	121755	—	0.1	—	0.1	1986	See Quality Criteria for Water, 1986 ("Gold Book") for narrative statement.
<u>Mercury (P)</u>	7439976 22967926	1.4	0.77	1.8	0.94	1995	<p>Freshwater and saltwater criteria for metals are expressed in terms of the dissolved metal in the water column. See Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria.</p>
<u>Methoxychlor</u>	72435	—	0.03	—	0.03	1986	See Quality Criteria for Water, 1986 ("Gold Book") for narrative statement.
<u>Methyl Tertiary-Butyl Ether (MTBE)</u>							
<u>Mirex</u>	2385855	—	0.001	—	0.001	1986	See Quality Criteria for Water, 1986 ("Gold Book") for narrative statement.

<u>Nickel (P)</u>	7440020	470	52	74	8.2	1995	<p>Freshwater and saltwater criteria for metals are expressed in terms of the dissolved metal in the water column. See Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria.</p> <p>The freshwater criterion for this metal is expressed as a function of hardness (mg/L). The value given here corresponds to a hardness of 100 mg/L.</p>
<u>Nonylphenol</u>	84852153	28 ug/L	6.6 ug/L	7 ug/L	1.7 ug/L	2005	
<u>Nutrients</u>	—	—	—	—	—	—	See EPA's Ecoregional criteria for Total Phosphorus, Total Nitrogen, Chlorophyll <i>a</i> and Water Clarity (Secchi depth for lakes; turbidity for streams and rivers) (& Level III Ecoregional criteria)
<u>Oil and Grease</u>	—	—	—	—	—	1986	See Quality Criteria for Water, 1986 ("Gold Book") for narrative statement.
<u>Oxygen, Dissolved Freshwater</u> <u>Oxygen, Dissolved Saltwater</u>	7782447	—	—	—	—	1986	See Quality Criteria for Water, 1986 ("Gold Book") for freshwater. For saltwater, see Aquatic Life Criteria for Dissolved Oxygen (Saltwater) . Cape Cod to Cape Hatteras .
<u>Parathion</u>	56382	0.065	0.013	—	—	1995	

<u>Pentachlorophenol (P)</u>	87865	19	15	13	7.9	1995	Freshwater aquatic life values for pentachlorophenol are expressed as a function of pH and values displayed in table correspond to a pH of 7.8.
pH	—	—	6.5 – 9	—	6.5 – 8.5	1986	<p>See Quality Criteria for Water, 1986 ("Gold Book") for narrative statement.</p> <p>For open ocean waters where the depth is substantially greater than the euphotic zone, the pH should not be changed more than 0.2 units from the naturally occurring variation or any case outside the range of 6.5 to 8.5. For shallow, highly productive coastal and estuarine areas where naturally occurring pH variations approach the lethal limits of some species, changes in pH should be avoided but in any case should not exceed the limits established for fresh water, i.e., 6.5-9.0.</p>
<u>Phosphorus Elemental</u>	7723140	—	—	—	—	1986	
Polychlorinated Biphenyls (PCBs) (P)	—	—	0.014	—	0.03	—	This criterion applies to total PCBs, (e.g., the sum of all congener or all isomer or homolog or Aroclor analyses.)
<u>Selenium (P)</u>	7782492	—	---	290	71	2016 Freshwater 1999 Saltwater	See Aquatic Life Ambient Water Quality Criterion for Selenium -Freshwater 2016 for narrative statement.
<u>Silver (P)</u>	7440224	3.2	—	1.9	—	1980	
<u>Solids Suspended and Turbidity</u>	—	—	—	—	—	1986	See Quality Criteria for Water, 1986 ("Gold Book") for narrative statement.

<u>Sulfide-Hydrogen Sulfide</u>	7783064	—	2.0	—	2.0	1986	
<u>Tainting Substances</u>	—	—	—	—	—	1986	See <u>Quality Criteria for Water, 1986 ("Gold Book")</u> for narrative statement.
<u>Temperature</u>	—	—	—	—	—	1986	Criteria is species dependent. See <u>Quality Criteria for Water, 1986 ("Gold Book")</u> .
<u>Toxaphene (P)</u>	8001352	0.73	0.0002	0.21	0.0002	1986	
<u>Tributyltin (TBT)</u>	—	0.46	0.072	0.42	0.0074	2004	
<u>Zinc (P)</u>	7440666	120	120	90	81	1995	
<u>4,4'-DDT (P)</u>	50293	1.1	0.001	0.13	0.001	1980	

Appendix A

Conversion Factors for Dissolved Metals

Metal	Freshwater CMC	Freshwater CCC	Saltwater CMC	Saltwater CCC
Arsenic	1.000	1.000	1.000	1.000
Cadmium	$1.136672 - [(\ln \text{ hardness})(0.041838)]$	$1.101672 - [(\ln \text{ hardness})(0.041838)]$	0.994	0.994
Chromium III	0.316	0.860	—	—
Chromium VI	0.982	0.962	0.993	0.993
Copper	0.960	0.960	0.83	0.83
Lead	$1.46203 - [(\ln \text{ hardness})(0.145712)]$	$1.46203 - [(\ln \text{ hardness})(0.145712)]$	0.951	0.951
Mercury	0.85	0.85	0.85	0.85
Nickel	0.998	0.997	0.990	0.990
Selenium	—	—	0.998	0.998
Silver	0.85	—	0.85	—
Zinc	0.978	0.986	0.946	0.946

Appendix B

Parameters for Calculating Freshwater Dissolved Metals Criteria That Are Hardness-Dependent

Chemical	mA	bA	mC	bC	Freshwater Conversion Factors (CF)	
					CMC	CCC
Cadmium	0.9789	-3.866	0.7977	-3.909	$1.136672 - [(\ln \text{hardness})(0.041838)]$	$1.101672 - [(\ln \text{hardness})(0.041838)]$
Chromium III	0.8190	3.7256	0.8190	0.6848	0.316	0.860
Lead	1.273	-1.460	1.273	-4.705	$1.46203 - [(\ln \text{hardness})(0.145712)]$	$1.46203 - [(\ln \text{hardness})(0.145712)]$
Nickel	0.8460	2.255	0.8460	0.0584	0.998	0.997
Silver	1.72	-6.59	—	—	0.85	—
Zinc	0.8473	0.884	0.8473	0.884	0.978	0.986

Hardness-dependant metals' criteria may be calculated from the following:

$$\text{CMC (dissolved)} = \exp\{mA [\ln(\text{hardness})] + bA\} \text{ (CF)}$$

$$\text{CCC (dissolved)} = \exp\{mC [\ln(\text{hardness})] + bC\} \text{ (CF)}$$

1/ CMC: Criterion Maximum Concentration

2/ CCC: Criterion Continuous Concentration

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